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# INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Article 36 and Rule 70)

Applicant's or agent's file reference P10094EP/JSH	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/GB 03/02461	International filing date (day/month/year) 06.06.2003	Priority date (day/month/year) 06.06.2002
International Patent Classification (IPC) or both national classification and IPC H01L41/24		
Applicant DELPHI TECHNOLOGIES, INC. et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.  
  
☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).  
  
 These annexes consist of a total of 4 sheets.

3. This report contains indications relating to the following items:
  - I ☒ Basis of the opinion
  - II ☐ Priority
  - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
  - IV ☐ Lack of unity of invention
  - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
  - VI ☐ Certain documents cited
  - VII ☐ Certain defects in the international application
  - VIII ☐ Certain observations on the international application

Date of submission of the demand  06.01.2004	Date of completion of this report  14.09.2004
Name and mailing address of the international preliminary examining authority:   European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer  Steiner, M  Telephone No. +49 89 2399-5784  

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. **PCT/GB 03/02461**

**I. Basis of the report**

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17):*

**Description, Pages**

2, 3, 6-12 as originally filed  
1, 4, 5 received on 23.08.2004 with letter of 20.08.2004

**Claims, Numbers**

2-10 as originally filed  
1 received on 23.08.2004 with letter of 20.08.2004

**Drawings, Sheets**

1/4-4/4 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).  
☐ the language of publication of the international application (under Rule 48.3(b)).  
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.  
☐ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority in written form.  
☐ furnished subsequently to this Authority in computer readable form.  
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.  
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:  
☐ the claims, Nos.:  
☐ the drawings, sheets:

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EXAMINATION REPORT**

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes: Claims	1-10
	No: Claims	
Inventive step (IS)	Yes: Claims	1-10
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-10
	No: Claims	

2. Citations and explanations

**see separate sheet**

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**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

Reference is made to the following document:

**D1 = US 6 356 008**

The subject of the present application is a method for producing a ferroelectric actuator for use in an injection arrangement. The initial block of layered ferroelectric material is cut to the final size of the actuator, and subsequently supplied with a primary external electrode with which the entire sample is polarised along a single, first axis. Thereafter, a permanent secondary external electrode arrangement in contact with the internal electrodes is applied, to which a secondary poling voltage is applied, polarising alternate layers in opposite directions.

Document D1 discloses a method of producing a layered piezoelectric resonator device. In this case, the initial block is polarised in a first, single direction via a first set of external electrodes, then alternate layers are polarised in opposite directions via a second pair of external electrodes in contact with the internal electrodes. After this polarisation, the block is cut to size into individual resonators, thereby necessitating a removal of the second pair of external electrodes.

The invention according to claim 1 of the present application differs from this in that then poling is carried out after cutting the initial block to the required size. Therefore, the second pair of external electrodes can be devised to be permanent. Also, the method claimed is for producing an actuator for a fuel injection system rather than a resonator.

Therefore, the subject-matter of claim 1 is novel in the sense of Article 33(2) PCT.

Cutting the initial ferroelectric block down to the desired size before the poling procedure allows applying all the final external electrodes already before the poling procedure, thus cutting down the number of steps required for the production of the actuator. Since in document D1 the second pair of external electrodes used for poling has to be removed from the initial block when cutting this block down to size after the poling procedure, the person skilled in the art would not consider the option of an initial permanent electrode arrangement, and hence would also not consider reversing the order of poling and cutting to arrive at the invention of claim 1 of the present application, but rather be lead away from this solution.

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Therefore, the subject-matter of claim 1 satisfies the requirements of the PCT with respect to an inventive step (Article 33(3) PCT).

Claims 2-10 are all dependent on claim 1 and therefore also meet the requirements of the PCT with respect to novelty and inventive step.

Furthermore, the application falls into the field of actuators for fuel injection systems, and therefore has application in industry (Article 33(4) PCT).

It is clear from the description that the application is concerned with the production of an actuator for use in a fuel injection system. Furthermore, it is disclosed in the original application that the initial block of ferroelectric material is cut down to size prior to the poling procedure (p. 12, ll. 9 - 17). All other features of the amended claim 1 are also present in the description as originally filed. The amendments therefore do not go beyond the disclosure of the invention as originally filed (Article 34(2) PCT).